

Table S1. Number of samples collected for pellet analysis, Stable Isotope Analysis (SIA), urban nests observations (Obs) and Fatty Acid analysis, in natural (Berlenga, Pessegueiro, Deserta, Sálvora) and urban colonies (Peniche and Porto), during pre-breeding (PreB), breeding (Breed) and post-breeding periods (PostB). Br-Ad = adults' breast feathers; Br-Ck = chicks' breast feathers; S8 = eighth secondary feathers; P1 = first primary feathers and RBC = red blood cells.

	Berlenga	Pesseg	Deserta	Sálvora	Peniche	Porto
<b>Pellet</b>						
PreB	36	26	36	35	-	93
Breed	34	33	34	32	61	68
PostB	54	39	39	-	30	97
<b>SIA</b>						
Br-Ad	17	11	8	-	7	9
Br-Ck	10	10	10	-	-	9
S8	17	11	9	-	7	9
P1	18	11	9	-	7	8
RBC	17	11	9	-	7	7
<b>Obs</b>	-	-	-	-	-	22
<b>FA</b>	10	-	-	-	-	11

Table S2. Summary statistics for the tested Generalized Linear Models (GLMM) representing the probability of occurrence of marine, refuse and terrestrial items in the Yellow-legged gulls' diet from pellet analysis, including fixed terms, random terms, df = degrees of freedom, AIC = Akaike's Information Criterion,  $\Delta AIC$  = difference in AIC, BIC = Bayesian Information Criterion, logLik = loglikelihood ratio statistic, Dev = deviance,  $\chi^2$  = chi-square statistics comparing the candidate models. Significant differences ( $p \leq 0.05$ ) are in bold.

Model	Fixed Terms	Rand. Terms	df	AIC	$\Delta AIC$	BIC	logLik	Dev	$\chi^2$	p ( $>\chi^2$ )
<b>Marine</b>										
1a	Colony + Period	1 Site	5	667.0	0	690.1	-328.5	657.0	0.39	0.82
1b	Colony * Period	1 Site	7	670.6	3.6	702.9	-328.3	656.6		
<b>Refuse</b>										
<b>2b</b>	<b>Colony * Period</b>	<b>1 Site</b>	<b>7</b>	<b>528.4</b>	<b>0</b>	<b>560.8</b>	<b>-257.2</b>	<b>514.4</b>	<b>18.29</b>	<b>&lt;0.001</b>
<b>2a</b>	<b>Colony + Period</b>	<b>1 Site</b>	<b>5</b>	<b>542.7</b>	<b>14.3</b>	<b>565.8</b>	<b>-266.3</b>	<b>532.7</b>		
<b>Terrest.</b>										
3a	Colony + Period	1 Site	5	916.87	0	940.0	-453.4	906.9	4.01	0.13
3b	Colony * Period	1 Site	7	916.86	0.01	949.2	-451.4	902.9		

Table S3. Parameter statistics for the linear RRPP models representing the  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  values in the Yellow-legged gull breast (Br), eighth secondary (S8), and first primary (P1) feathers, red blood cells (RBC), and chicks' breast feathers (Br - chicks) from different colonies. Statistics were obtained from 10.000 random permutations of residuals and include coefficient vector lengths ( $d$  = distance) with the observed values, Z-scores and p-values. Berlenga was set as reference level and significance was determined when  $p \leq 0.05$ .

	$\delta^{13}\text{C}$			$\delta^{15}\text{N}$		
	<b>d</b>	<b>Z-score</b>	<b>P(&gt;d)</b>	<b>d</b>	<b>Z-score</b>	<b>P(&gt;d)</b>
<b>Adult gull models</b>						
<b>Whole year (Br)</b>						
Pessegueiro	0.01	-1.21	0.9387	0.19	-0.43	0.5930
Deserta	0.10	-0.74	0.7227	0.75	1.84	0.0549
Peniche	<b>0.77</b>	<b>3.38</b>	<b>0.0040</b>	0.67	1.35	0.1063
Porto	<b>0.58</b>	<b>2.58</b>	<b>0.0184</b>	<b>0.75</b>	<b>1.99</b>	<b>0.0468</b>
<b>Non-Breeding (S8)</b>						
Pessegueiro	0.08	-0.97	0.8202	<b>1.06</b>	<b>3.55</b>	<b>0.0027</b>
Deserta	0.73	1.76	0.0625	<b>0.82</b>	<b>2.23</b>	<b>0.0308</b>
Peniche	0.14	-0.81	0.7539	<b>0.89</b>	<b>2.16</b>	<b>0.0354</b>
Porto	0.17	-0.61	0.6693	0.48	0.71	0.2215
<b>Breeding Season (P1)</b>						
Pessegueiro	0.39	0.83	0.1962	<b>1.10</b>	<b>3.58</b>	<b>0.0032</b>
Deserta	0.20	-0.30	0.5390	0.60	1.20	0.1258
Peniche	0.34	0.31	0.3297	0.78	1.65	0.0715
Porto	0.58	1.57	0.0817	<b>1.17</b>	<b>3.39</b>	<b>0.0039</b>
<b>Incubation Period (RBC)</b>						
Pessegueiro	0.13	-0.52	0.6301	0.17	-0.67	0.6928
Deserta	0.18	-0.26	0.5266	0.77	1.51	0.0908
Peniche	<b>1.02</b>	<b>4.19</b>	<b>0.0007</b>	0.87	1.64	0.0757
Porto	0.57	1.73	0.0682	<b>2.10</b>	<b>5.85</b>	<b>0.0001</b>
<b>Chick gull models</b>						
Pessegueiro	0.36	1.78	0.06120	0.43	1.18	0.1345
Deserta	0.07	-0.76	0.73430	< 0.001	-1.35	0.9995
Porto	<b>0.46</b>	<b>2.50</b>	<b>0.01820</b>	<b>0.88</b>	<b>3.60</b>	<b>0.0021</b>

Table S4. Pairwise isotopic niche dispersion metrics for different tissues of adult Yellow-legged gulls, representing different time periods, and for chicks' breast feathers, from natural (1 = Pessegueiro, 2 = Berlenga, 3 = Deserta) and urban (4 = Peniche and 5 = Porto) colonies. Presented metrics include dist = Euclidian distances between centroids; absolute value of the difference between the means distances to centroid (CD); absolute value of the difference between the nearest neighbor mean distances (NND); Standard (containing 40% of observations) and 95% ellipses overlap, based on the maximum likelihood fitted ellipses (presented in raw area and proportion). In bold are the parameters with significant effects ( $p \leq 0.05$ ) in the linear RRPP full nested models with colony and sample tissue as dependent variables in a nesting model design (\*), and RRPP individual models per tissue with colony as dependent variable (\*\*).

	dist	CD <sub>1</sub> -CD <sub>2</sub>	NND <sub>1</sub> -NND <sub>2</sub>	Standart Overlap		95% Overlap	
				Area	Prop (%)	Area	Prop (%)
<b>Adult gull Models</b>							
<b>Whole year (Br)</b>							
1 - 2	0.20	0.04	0.04	0.56	45.76	3.51	49.40
1 - 3	0.56	0.09	0.26	0.68	32.08	4.82	40.16
1 - 4	0.93	0.29	0.20	0.27	14.28	4.04	45.96
1 - 5	0.82	0.07	0.03	0.22	14.65	2.84	38.79
2 - 3	0.75	0.13	<b>0.30**</b>	0.57	26.17	5.03	44.56
2 - 4	<b>1.03**</b>	<b>0.32**</b>	0.24	0.26	14.48	3.18	34.66
2 - 5	<b>0.95**</b>	0.11	0.07	0.10	6.52	2.91	42.97
3 - 4	0.87	0.19	0.07	0.18	6.11	4.13	28.72
3 - 5	0.68	0.02	0.24	0.09	3.48	3.93	32.96
4 - 5	0.21	0.22	0.17	0.44	28.82	3.01	34.01
<b>Non-Breeding (S8)</b>							
1 - 2	1.07	0.02	0.08	0.28	9.42	3.98	25.69
1 - 3	0.69	0.55	<b>0.44**</b>	0.93	17.01	6.08	18.89
1 - 4	<b>0.28**</b>	0.33	0.27	0.14	9.26	2.98	43.60
1 - 5	0.59	0.30	0.11	0.36	20.82	3.85	45.10
2 - 3	1.10	0.57	0.35	0.92	14.19	<b>11.09*</b>	33.32
2 - 4	0.90	0.31	0.18	0.23	9.36	2.28	16.73
2 - 5	0.51	0.28	0.03	0.71	29.65	5.19	39.02
3 - 4	0.87	<b>0.88*/**</b>	0.17	0.49	9.15	3.11	9.85
3 - 5	0.66	<b>0.85*</b>	0.32	<b>0.85*</b>	15.73	5.72	18.12
4 - 5	0.52	0.02	0.16	0.34	30.14	2.43	37.91
<b>Breeding (P1)</b>							
1 - 2	1.17	0.41	0.17	0.00	0.00	1.78	19.50
1 - 3	0.77	0.45	0.09	0.555	23.26	3.83	27.81
1 - 4	0.33	0.22	0.09	0.403	26.04	3.89	49.80
1 - 5	<b>0.21**</b>	0.16	0.31	<b>1.114*/**</b>	49.80	<b>6.83**</b>	51.56
2 - 3	0.64	<b>0.86*</b>	0.27	0.064	2.95	2.43	22.28
2 - 4	0.85	0.19	0.26	0.029	2.42	1.60	27.49
2 - 5	1.31	0.24	<b>0.48*</b>	0.056	2.17	2.60	19.70
3 - 4	0.57	0.67	0.01	0.249	11.83	2.18	18.30
3 - 5	0.97	<b>0.62*</b>	0.22	0.680	22.14	5.31	30.93
4 - 5	0.46	0.05	0.22	0.568	25.85	3.94	31.20
<b>Incubation Period (RBC)</b>							

1 - 2	0.21	0.10	0.16	0.33	28.33	2.30	34.12
1 - 3	0.68	0.15	0.02	0.39	35.27	3.51	63.87
1 - 4	1.35	0.05	0.37	0.09	3.60	3.62	32.41
1 - 5	<b>2.06*/**</b>	0.13	0.17	0.00	0.00	2.22	22.54
2 - 3	0.79	0.05	0.14	0.25	19.40	2.68	41.76
2 - 4	1.35	0.15	0.53	0.11	4.42	3.64	32.35
2 - 5	<b>2.18*/**</b>	0.03	0.33	0.00	0.00	1.99	19.51
3 - 4	0.85	0.20	0.39	0.06	2.65	4.06	37.60
3 - 5	1.39	0.02	0.19	0.02	0.88	3.07	33.82
4 - 5	1.31	0.18	0.20	0.00	0.00	2.99	19.96

#### Chick gull models

1-2	0.56	0.30	0.14	0.05	0.10	0.76	0.29
1-3	0.52	0.08	0.05	0.01	0.03	0.60	0.32
1-5	1.54	0.36	0.11	0.00	0.00	0.37	0.08
2-3	0.07	0.22	0.09	0.22	0.45	1.40	0.50
2-5	0.99	0.06	<b>0.03**</b>	0.07	0.07	1.57	0.30
3-5	1.02	0.28	0.06	0.00	0.00	1.13	0.23

Table S5. Layman isotopic niche dispersion metrics for different tissues of adult Yellow-legged gulls, representing different time periods, and for chicks' breast feathers, from natural and urban colonies. Presented metrics include both isotopes range ( $\delta^{15}\text{NR}$  and  $\delta^{13}\text{CR}$ ) = distance between samples with maximum and minimum isotopic values, TA = convex hull area, CD = mean distance to centroid, NND = mean nearest neighbor distance and SEAc = Standard Ellipse Area, corrected for small sample sizes. In bold are the parameters with significant effects ( $p \leq 0.05$ ) in the linear RRPP full nested models with colony and sample tissue as dependent variables in a nesting model design (\*), and RRPP individual models per tissue with colony as dependent variable (\*\*).

	$\delta^{15}\text{NR}$	$\delta^{13}\text{CR}$	TA	CD	NND	SEAc
<b>Adult gull Models</b>						
<b>Whole year (Br)</b>						
Nat (Pessegueiro)	2.65	1.88	1.94	0.76	0.36	0.93
Nat (Berlenga)	3.63	1.32	2.19	0.72	0.32	0.85
Nat (Deserta)	3.45	1.77	2.92	0.85	<b>0.63**</b>	1.88
Urb (Peniche)	3.02	2.44	1.47	<b>1.04**</b>	0.56	1.22
Urb (Porto)	3.01	0.84	1.19	0.83	0.39	0.77
<b>Non-Breeding (S8)</b>						
Nat (Pessegueiro)	3.14	2.72	2.12	1.05	0.32	1.12
Nat (Berlenga)	2.76	2.96	5.21	1.03	0.40	2.13
Nat (Deserta)	2.53	<b>4.48*</b>	<b>8.28*</b>	<b>1.60*</b>	0.76	<b>5.28*</b>
Urb (Peniche)	2.71	2.23	0.66	0.72	0.59	0.52
Urb (Porto)	2.33	1.36	1.46	0.74	0.43	0.96
<b>Breeding Season (P1)</b>						
Nat (Pessegueiro)	2.54	<b>2.97**</b>	2.19	1.01	0.41	1.27
Nat (Berlenga)	2.28	1.66	1.55	0.60	0.24	0.55
Nat (Deserta)	4.85	2.18	2.58	<b>1.46*/**</b>	0.51	1.67
Urb (Peniche)	1.45	2.63	0.78	0.79	0.50	0.68
Urb (Porto)	2.12	2.89	3.27	0.84	<b>0.72*/**</b>	<b>2.09**</b>
<b>Incubation Period (RBC)</b>						
Nat (Pessegueiro)	3.07	<b>2.32**</b>	1.29	0.94	0.38	0.74
Nat (Berlenga)	2.74	1.15	1.93	0.84	0.21	0.76
Nat (Deserta)	2.52	1.47	1.21	0.79	0.35	0.76
Urb (Peniche)	2.59	2.29	2.31	0.99	<b>0.74**</b>	1.73
Urb (Porto)	2.32	1.56	1.62	0.81	0.54	1.28
<b>Chick gull models</b>						
Nat (Pessegueiro)	<b>0,81**</b>	0,68	0,26	0,26	0,16	0,81
Nat (Berlenga)	2,23	0,83	0,73	0,56	0,30	2,23
Nat (Deserta)	1,51	0,66	0,50	0,34	0,21	1,51
Urb (Porto)	1,36	1,46	0,99	0,62	0,27	1,36

Table S6. Fatty acid concentration from plasma samples of Yellow-legged gulls from natural and urban colonies (SFA – Saturated Fatty Acids, MUFA – Monounsaturated Fatty Acids, PUFA – Polyunsaturated Fatty Acids, HUFA – Highly Unsaturated Fatty Acids)

Fatty Acids (µg/g)	Natural										
	A	B	C	D	E	F	H	I	J	K	
C14:0	1.0	30.7	156.9	311.2	72.0	0.6	5.5	41.2	74.4	0.4	
C15:0	0.5	88.2	-	-	-	-	-	-	-	-	
C16:0	24.0	-	156.8	308.7	63.2	3.9	10.3	109.9	437.9	35.4	
C17:0	1.1	-	-	-	-	0.2	0.4	-	9.1	1.3	
C18:0	38.0	78.7	131.7	240.6	46.7	5.1	17.2	172.8	490.0	40.1	
C20:0	1.2	-	-	-	-	-	-	-	-	-	
C21:0	4.8	69.6	-	21.4	51.7	0.5	5.3	98.2	255.6	39.7	
C22:0	1.4	7.7	171.4	-	-	0.4	1.8	48.4	159.6	17.7	
<b>TOTAL SFA</b>	<b>71.9</b>	<b>274.9</b>	<b>616.9</b>	<b>881.9</b>	<b>233.7</b>	<b>10.7</b>	<b>40.4</b>	<b>470.4</b>	<b>1426.7</b>	<b>134.6</b>	
C18:1	-	4.7	-	-	6.9	0.1	-	7.2	18.6	2.2	
C18:1n9t	2.6	20.5	55.4	5.9	43.9	0.5	-	61.7	99.5	12.5	
<b>TOTAL MUFA</b>	<b>2.6</b>	<b>25.1</b>	<b>55.4</b>	<b>5.9</b>	<b>50.8</b>	<b>0.6</b>	<b>-</b>	<b>68.8</b>	<b>118.1</b>	<b>14.7</b>	
C18:2n6c	-	8.0	-	-	4.8	-	-	35.3	29.8	3.9	
C18:3	9.7	27.3	-	-	30.2	2.2	4.8	38.2	118.2	9.9	
C20:3n6	3.2	47.2	211.2	-	113.6	0.6	5.9	72.5	109.7	14.5	
<b>TOTAL PUFA</b>	<b>12.9</b>	<b>82.6</b>	<b>211.2</b>	<b>0.0</b>	<b>148.7</b>	<b>2.9</b>	<b>10.6</b>	<b>146.0</b>	<b>257.7</b>	<b>28.3</b>	
C20:4n6 (ARA)	2.0	-	40.0	488.3	30.1	0.3	1.2	-	20.5	2.0	
C20:5n3 (EPA)	4.8	4.5	-	-	-	-	-	-	83.2	-	
C22:6n3 (DHA)	-	4.4	-	-	-	-	-	2.2	-	-	
<b>Total HUFA</b>	<b>6.8</b>	<b>8.9</b>	<b>40.0</b>	<b>488.3</b>	<b>30.1</b>	<b>0.3</b>	<b>1.2</b>	<b>2.2</b>	<b>103.7</b>	<b>2.0</b>	
<i>N</i>	<b>13</b>	<b>12</b>	<b>7</b>	<b>6</b>	<b>10</b>	<b>11</b>	<b>9</b>	<b>11</b>	<b>13</b>	<b>12</b>	

Table S6. continued

Fatty Acids (µg/g)	Urban										
	L	M	N	O	P	Q	R	S	T	U	V
C14:0	49.9	10.0	6.2	5.6	108.1	374.1	538.1	545.3	201.3	57.2	107.6
C16:0	189.2	41.0	76.4	40.7	121.6	854.9	685.2	911.3	444.1	203.6	251.9
C17:0	3.4	1.0	-	-	-	-	-	-	-	-	-
C18:0	215.8	45.7	247.5	41.0	64.7	709.3	604.1	767.2	416.3	245.9	183.8
C20:0	-	-	-	-	-	-	-	-	-	1.2	-
C21:0	162.1	20.8	9.2	20.5	23.5	290.9	102.8	284.5	263.6	189.8	72.1
C22:0	51.9	11.7	5.8	11.5	108.9	150.0	682.3	774.0	272.8	-	121.0
<b>TOTAL SFA</b>	<b>672.3</b>	<b>130.1</b>	<b>345.2</b>	<b>119.3</b>	<b>426.7</b>	<b>2379.1</b>	<b>2612.6</b>	<b>3282.3</b>	<b>1598.1</b>	<b>697.7</b>	<b>736.4</b>
C18:1	50.9	1.9	-	1.7	30.8	31.6	11.9	17.8	9.0	41.1	7.1
C18:1n9t	15.6	9.2	-	10.7	-	260.3	84.8	147.3	110.0	20.4	95.6
<b>TOTAL MUFA</b>	<b>66.5</b>	<b>11.1</b>	<b>-</b>	<b>12.4</b>	<b>30.8</b>	<b>292.0</b>	<b>96.7</b>	<b>165.1</b>	<b>119.0</b>	<b>61.5</b>	<b>102.7</b>
C18:2n6c	18.5	2.6	-	3.8	12.4	99.1	23.2	72.0	56.3	16.0	28.5
C18:3	48.2	13.1	104.8	45.4	20.1	194.2	321.3	276.8	114.1	56.7	79.5
C20:3n6	89.0	11.2	8.4	5.5	108.5	529.7	784.6	858.1	305.5	79.6	133.4
<b>TOTAL PUFA</b>	<b>155.7</b>	<b>27.0</b>	<b>113.2</b>	<b>54.7</b>	<b>141.0</b>	<b>823.1</b>	<b>1129.1</b>	<b>1207.0</b>	<b>475.9</b>	<b>152.2</b>	<b>241.4</b>
C20:4n6 (ARA)	11.8	-	3.6	4.8	30.0	69.7	130.0	96.2	28.1	17.6	23.0
C22:6n3 (DHA)	9.6	-	1.6	1.2	-	24.5	-	-	-	-	-
<b>TOTAL HUFA</b>	<b>21.4</b>	<b>-</b>	<b>5.2</b>	<b>6.0</b>	<b>30.0</b>	<b>94.2</b>	<b>130.0</b>	<b>96.2</b>	<b>28.1</b>	<b>17.6</b>	<b>23.0</b>
<i>N</i>	<b>13</b>	<b>11</b>	<b>9</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>

Table S7. Results of SIMPER analyses showing average similarity of fatty acids (FA) content within the natural colony of Berlenga (N = 10) and the urban colony of Porto (N = 11), according to non-metric multidimensional scaling (n-MDS) analysis.

<b>MDS Groups</b>	<b>FA</b>	<b>Av. Abund</b>	<b>Av. Sim</b>	<b>Sim/SD</b>	<b>Contrib. %</b>	<b>Cum. %</b>
<b>Natural</b>	C18:0	0.31	10.55	3.04	22.86	22.86
	C16:0	0.27	7.44	1.54	16.12	38.98
	C20:3n6	0.19	4.87	1.26	10.55	49.54
	C21:0	0.18	4.82	1.27	10.45	59.99
	C14:0	0.20	4.66	1.30	10.09	70.07
	C18:3	0.12	3.65	1.12	7.90	77.98
	C18:1n9t	0.14	3.58	1.27	7.75	85.73
	C22:0	0.14	2.43	0.89	5.27	91.00
<b>Urban</b>	C18:0	0.52	11.06	2.93	17.90	17.90
	C16:0	0.53	10.52	3.62	17.04	34.94
	C18:3	0.31	6.71	2.80	10.87	45.81
	C20:3n6	0.42	6.43	2.01	10.41	56.22
	C21:0	0.32	6.36	2.49	10.30	66.52
	C14:0	0.35	5.64	2.12	9.13	75.65
	C22:0	0.35	4.75	1.42	7.69	83.34
	C18:1n9t	0.21	2.88	1.18	4.66	88.00
	C20:4n6	0.16	2.66	1.71	4.31	92.30



Table S8. Results of SIMPER analyses showing average dissimilarity of fatty acids (FA) content between the natural colony of Berlenga (N = 10) and the urban colony of Porto (N = 11), according to non-metric multidimensional scaling (n-MDS) analysis.

MDS Group	FA	Av.Abund.	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
<b>Natural vs Urban</b>	C16:0	0.27	0.53	6.34	1.71	13.01	13.01
	C18:0	0.31	0.52	5.64	1.41	11.57	24.58
	C20:3n6	0.19	0.42	5.45	1.53	11.18	35.76
	C22:0	0.14	0.35	5.09	1.5	10.46	46.21
	C14:0	0.2	0.35	4.84	1.52	9.93	56.14
	C21:0	0.18	0.32	4.19	1.55	8.59	64.74
	C18:3	0.12	0.31	4.06	1.59	8.32	73.06
	C20:4n6	0.14	0.16	3.17	1.01	6.5	79.56
	C18:1n9t	0.14	0.21	3.07	1.54	6.3	85.87
	C18:2n6c	0.06	0.15	2.25	1.63	4.62	90.48

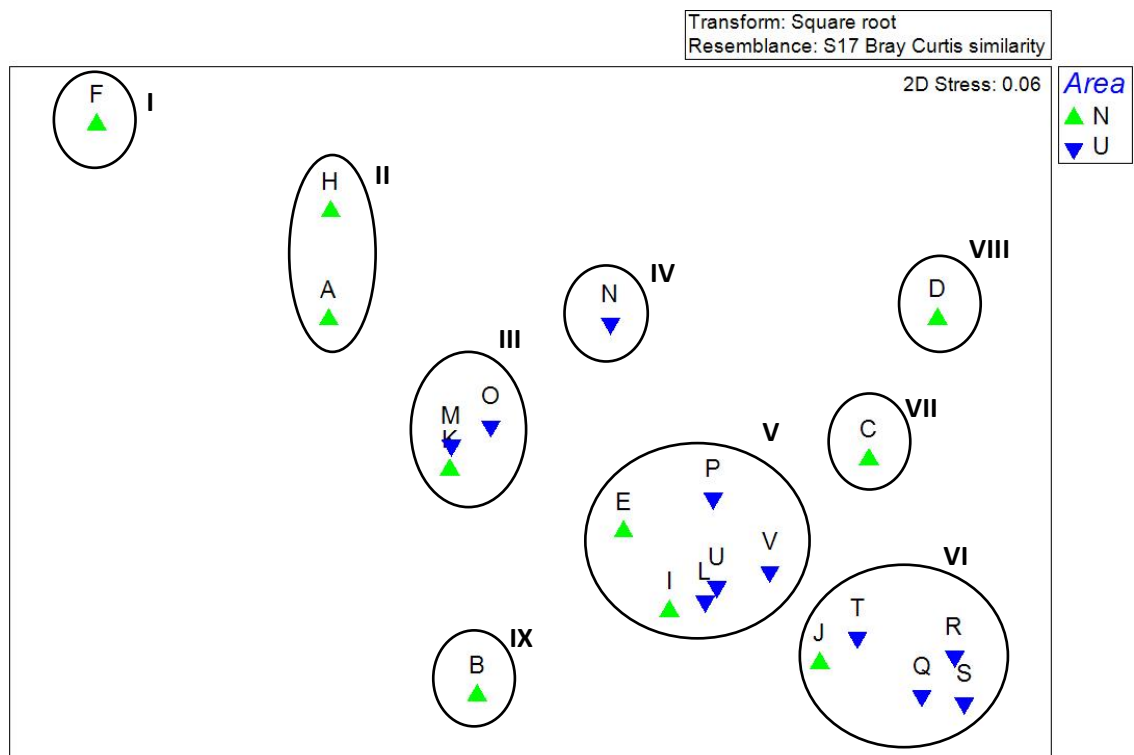


Fig. S1. Two-dimensional non-metric MDS ordination plot of FA content of Yellow-legged gulls from natural (green, from A to K) and urban (blue, from L to V) colonies. From I to VIII represent distinct groups at the MDS plot according to FA profile.